HP Support document

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HP Workstation xw6200 - Specifications

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System specifications

Tower dimensions (H x W x D)	U.S.	Metric
Height	17.3 inches	44.1 cm
Width	6.5 inches	16.5 cm
Depth	17.3 inches	44.0 cm
Weight (standard of configuration)	35 lbs	16 kg
Power supply		
Rated Line Frequency	50-60 Hz / 400 Hz	
Rated Input Current	9 A / 9 A	
Maximum Rated Power	500 W	
Temperature		

Operating	5 to 35 degrees C (40 to 95 degrees F)
Non-operating	-40 to 60 degrees C (-40 to 140 degrees F)
Humidity	
Operating	8 to 85 percent
Non-operating	8 to 90 percent
Maximum Altitude	
Operating	3,000 m (10,000 feet)
Non-operating	9,100 m (30,000 feet)

Audio

Audio Subsystem
An Audio Devices ADI1981B Codec audio controller is interfaced to the ICH5R by an AC'97 link (Rev 2.1 compliant). Features of the audio subsystem include the following: • One front speaker • External speaker or headphone devices have priority over the internal devices • External microphone input (stereo) • Headphone output (stereo)

AC '97 Integrated ADI 1981B Audio	
Type	Integrated
AC97 Stereo Codec	Yes
FM Synthesis Support	Yes - Yamaha XG Lite
OPL3 FM Synthesis Support	Yes
Sound Blaster Compatibility	Yes
SPDIF 6-channel pass-through	Yes
Audio Jacks	Microphone-In (20-K ohm Input Impedance); rear stereo and front analog microphone ports Line-In (12-K ohm Input Impedance)

	Line-Out * (less than 800 ohms Output Impedance, expects at least a 10-K ohm load) Headphone-Out (2.5 Ohms Output Impedance, expects at least a 32 ohm load)
NOTE: Internal speaker amplifier is for internal speaker only. External speakers need to be powered externally.	
Sampling	7 - 48 kHz
Wavetable Synthesis (software)	Yes - GM and FM Midi support, Direct Music and Down Loadable Soundset (4 meg DLS level 1 and 2 support)
3D Positional Sound	No
Digital Audio	Yes
Analog Audio	Yes
Number of Channels on Line-Out (mono/stereo)	Stereo (left and right channels)
Internal Audio Speaker Power Rating	3 W
Internal Speaker	Yes
Hardware Equalizer for Internal Speaker	Fixed 7 Band ParametricEQ
External Speaker Jack (Line-Out)	Yes

Bays and slots

Expansion bays			
Bays	**Internal**	**External**	**Total/Available**
Quantity	(2) 3.5 inch bays with acoustic dampening rail assemblies	• (2) 5.25 inch full length 2003 mm maximum device depth (top bay	5

		is limited to 198 mm depth when optional smart cover solenoid lock is installed). Bottom bay can be converted to an internal 3.5-inch 3rd Hard Drive bay using optional bracket • (1) 3.5 inch bay for optional floppy drive	
Used	1	1	3
Open	1	2	3
Expansion slots			
Slots	**PCI**		**Total**
Quantity	• 4 PCI slots (full-height, full-length) • 1 PCI Express (x8 mechanically, x4 electrically) • 1 PCI Express x16 graphics		6
Used	0		0

Open	6	6

Front components

1. Optical drive (optional)
2. Optical drive activity lights
3. 5.25 inch drive bays
4. Diskette drive (optional)
5. Optical drive eject button
6. Power on light
7. Power button
8. Hard drive activity light
9. USB ports (2)
10. Headphone connector
11. Microphone connector
12. IEEE-1394 connector (optional)

Communications

The xw6200 features the Broadcom 5751 PCI-E Gbit LOM. This devices supports PCI-Express x1 lanes and provides a GMI/MII management interface. It supports the PXE 2.1 specification. The LOM is ACPI 2.0 compliant and supports Wake-on-LAN.

The Broadcom 5782 10/100/1000 (PCI) is available as a factory option.

The Broadcom NetXtreme Gigabit NIC and Intel Pro 1000 MT Gigabit NIC (FH only) PCI are available as aftermarket kits.

Integrated Broadcom 5751 Gigabit Ethernet LAN-on-Motherboard	
Connector	RJ-45
Controller	Broadcom 5751 PCI-E LAN Controller

Media access controller	Yes, triple speed, IEEE 802.3 compliant
Memory	On-chip buffer memory
Data rates supported	10/100/1000 Mbps
Compliance	IEEE 802.1A, 802.1P, 802.1Q, 802.2, 802.3, 802.3AB and 802.3u compliant, 802.3x flow control
Bus architecture	PCI-Express host interface 1x Lane 4-pin interface Functionality identical to PCI PCI-Express provides wirespeed non-blocking throughput
Power requirement	1.48 watts @ +3.3V AUX supply with 5V tolerance
Network transfer rate	10BASE-T (half-duplex) 10 Mbps 10BASE-T (full-duplex) 20 Mbps 100BASE-TX (half-duplex) 100 Mbps 100BASE-TX (full-duplex) 200 Mbps 1000BASE-T, 1000 Mbps
Operating system driver support	Microsoft Windows NT 4.0, Microsoft Windows 98, Microsoft 2000, Microsoft XP, Linux 2.2, Linux 2.4
Management capabilities	ACPI, WOL and DMI 2.0, PXE 2.0, WfM 2.0
Alerting	ASF 2.0
HP Gigabit by Broadcom (BCM5782) NIC	
Connector	RJ-45
Controller	Broadcom 5782 PCI LAN Controller
Memory	Integrated 96 Kb frame buffer

	memory	
Data rates supported	10/100/1000 Mbps	
Compliance	IEEE 802.1A, 802.1P, 802.1P, 802.1Q, 802.2, 802.3, 802.3AB and 802.3u compliant, 802.3x flow control	
Bus architecture	PCI 2.2	
Data path width	32-bit, 33/66 MHz bus interface	
Data transfer mode	Bus-master DMA	
Hardware certifications	FCC, B, CE, TUV- cTUVus Mark Canada and United States, TUV- GS Mark for European Union	
Power requirement	1.48 watts @ +3.3V AUX supply with 5V tolerance	
Boot ROM support	Yes	
Network transfer rate	10BASE-T (half-duplex) 10 Mbps 10BASE-T (full-duplex) 20 Mbps 100BASE-TX (half-duplex) 100 Mbps 100BASE-TX (full-duplex) 200 Mbps 1000BASE-T, 1000 Mbps	
Environmental	Operating temperature	0 to 55 degrees C (32 to 131 degrees F)
	Operating humidity	55 degrees C (85 percent at 131 degrees F)
Dimensions	12 x 5 x 1.9 cm (4.7 x 2.0 x 0.08 inches)	
Operating system driver support	Microsoft Windows NT 4.0, Microsoft Windows 98, Microsoft 2000, Microsoft XP, Linux 2.2, Linux 2.4	

Management capabilities	ACPI, WOL and DMI 2.0, PXE 2.0, WfM 2.0, Broadcom mgmt utility	
Alerting	ASF 1.0	
Kit contents	Broadcom 5782, CD, Broadcom Gigabit Ethernet for HP, drivers, quick install guide, product warranty statement	
Intel Pro/1000MT NIC		
Connector	RJ-45	
Controller	Intel 82540EM Gigabit Controller	
Memory	Integrated 96 Kb frame buffer memory	
Data rates supported	10/100/1000 Mbps	
Compliance	IEEE 802.1A, 802.1P, 802.1P, 802.1Q, 802.2, 802.3, 802.3AB and 802.3u compliant, 802.3x flow control	
Bus architecture	PCI 2.2	
Data path width	32-bit, 22/66 MHz bus interface	
Data transfer mode	Bus-master DMA	
Hardware certifications	FCC, B, CE, TUV- cTUVus Mark Canada and United States, TUV- GS Mark for European Union	
Power requirements	1.48 watts @ +3.3V AUX supply with 5V tolerance	
Boot ROM support	Yes	
Network transfer rate	10BASE-T (half-duplex) 10 Mbps 10BASE-T (full-duplex) 20 Mbps 100BASE-TX (half-duplex) 100 Mbps 100BASE-TX (full-duplex) 200 Mbps 1000BASE-T, 1000 Mbps	
Environmental	Operating temperature	0 to 55 degrees C (32 to 131 degrees

		F)
	Operating humidity	55 degrees C (85 percent at 131 degrees F)
Dimensions	12 x 5 x 1.9 cm (4.7 x 2.0 x 0.08 inches)	
Operating system driver support	Microsoft Windows NT 4.0, Microsoft Windows 98, Microsoft 2000, Microsoft XP, Linux 2.2, Linux 2.4	
Management capabilities	ACPI, WOL and DMI 2.0, PXE 2.0, WfM 2.0, Intel PROset II utility	
Alerting	ASF 1.0	
Kit contents	Broadcom 5782, CD, Broadcom Gigabit Ethernet for HP, drivers, quick install guide, product warranty statement	

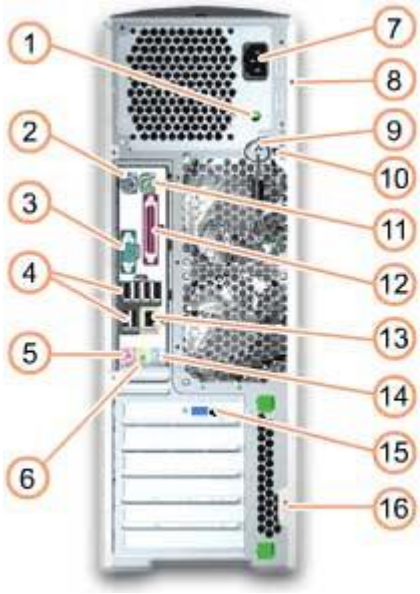
1.44-MB diskette drive (optional)

Diskette size	8.89 cm (3.5 inches)
LED Indicators (front panel)	Green
Read/Write Capacity per Diskette (high/low)	1.44 MB/720 KB
Drive Height	2.54 cm (1.0 inches)
Drive Rotation	300 rpm
Transfer Rate (high/low)	500/250 Kb/s
Bytes/Sector	512
Sectors/Track (high/low)	18/9
Tracks/Side (high/low)	80/80
Access times	
Track-to-Track (high/low)	3/3 ms
Average (high/low)	94/94 ms
Settling Time	15 ms
Latency Average	100 ms
Cylinders (high/low)	80/80
Read/Write Heads	Two

I/O Subsystem

Rear panel components
Front components

Rear Panel Components



1. Built-In Self Test (BIST) LED
2. Microphone Connector (pink)
3. Serial Connector (teal)
4. USB ports (6)
5. Microphone connector (pink)
6. Line-out connector (light green)
7. Power Cord Connector
8. Universal clamp lock hole
9. Padlock loop
10. Access panel key
11. PS/2 Keyboard Connector (purple)
12. Parallel connector (dark pink)
13. RJ-45 network connector
14. Line-In audio connector (light blue)
15. Graphics out port
16. Cable lock slot

Front Components

1. Optical drive (optional)
2. Optical drive activity lights
3. 5.25 inch drive bays
4. Diskette drive (optional)
5. Optical drive eject button
6. Power on light
7. Power button
8. Hard drive activity light
9. USB ports (2)
10. Headphone connector
11. Microphone connector
12. IEEE-1394 connector (optional)

Hard drive specifications

Disk drive technologies
7200 rpm SATA hard drives
10,000 rpm SATA hard drives
Ultra320 SCSI hard drives (10,000 rpm)
Ultra320 SCSI hard drives (15,000 rpm)

Disk drive technologies

SATA

SATA support is provided through a two-port SATA controller on the chipset. The xw6200 supports two SATA drives. The following SATA drives are supported options:

- 80 GB 7200 rpm SATA drive
- 160 GB 7200 rpm SATA drive
- 250 GB 7200 rpm SATA drive
- 36 GB 10000 rpm SATA drive
- 74 GB 10000 rpm SATA drive

These drives are available as factory integrated options or as aftermarket kits. The aftermarket kits are supplied with SATA cables.

SCSI

SCSI support is provided by an optional PCI card. The LSI 20320AR

SCSI controller supports single channel U320 SCSI, optional 0,1 RAID, and an external connector board for demanding SCSI applications. An optional Adaptec 2120S U320 SCSI RAID controller is available as an aftermarket option.
Up to three internal SCSI drives may be installed on the xw6200; the third drive requires the optional Optical Bay Converter kit.
The following SCSI drives are supported:

- 73 GB 10000 rpm SCSI drive
- 36 GB 15000 rpm SCSI drive
- 73 GB 15000 rpm SCSI drive

IDE
The xw6200 has an on-board ATA/IDE-100 controller but IDE hard disk drives (40/80 GB) are after-market only.
Multibay
The xw6200 is multibay-enabled.
Mixed SATA/SCSI drives
The following table shows the recommended physical hard drive configurations for the xw6200 workstation. The following configurations reflect default BIOS boot order rules.
NOTE: Mixed SATA/SCSI configurations are not supported under Linux.

Drive type	First hard drive bay (primary boot)	Second hard drive bay	Third hard drive (optical bay)
All SATA	SATA	SATA	empty
All SATA	SATA	SATA	SATA (plug-in card)
Mixed	SATA	SCSI	SCSI
All SCSI	SCSI	SCSI	SCSI
All SATA	SATA (plug in card)	SATA (plug in card)	SATA (plug in card)
All SCSI	SCSI (plug in card)	SCSI (plug in card)	SCSI (plug in card)

RAID
SATA
The embedded SATA controller on the xw6200 supports RAID 0 and 1 on up to 2 SATA drives; RAID migration is not supported. Users should move the operating system to an IDE or SCSI drive. The workstation is shipped with RAID not enabled. The user must enable RAID in the BIOS.
SCSI
SCSI RAID on the xw6200 is provided by the LSI 220320-R add-in card. The workstation is shipped with RAID not enabled. The user must enable

RAID in the BIOS, flash the SCSI firmware, and install the LSI CIM Browser. A detailed description of this procedure will be provided in a later refresh.
The Adaptec 2120S U320 SCSI RAID Controller is available as an aftermarket option.

Boot order

The following diagram shows the boot order of hard drives (C:) connected to the different controllers in the workstation system. Users can modify the boot order in the Computer Setup Utility by arranging the Controller Order on the Storage tab. The diagram does not show other bootable device options such as a diskette, CD-ROM, USB, network, and so on. In the Computer Setup Utility, you can arrange the boot order on the Storage tab.

7200 rpm SATA hard drives

7200 rpm Serial ATA Hard Drives	
40 GB	
Capacity	40,020,000,000 bytes
Height	2.54 mm (1 inch)
Width	Media diameter: 8.89 cm (3.5 inches) Physical size: 10.2 cm (4 inches)
Interface	Serial ATA
Synchronous Transfer Rate (Maximum)	150 MB/s
Buffer	2 MB
Rotational Speed	7,200 rpm
80 GB	
Capacity	80,026,361,856 bytes
Height	2.54 cm (1 inch)
Width	Media diameter: 8.9 cm (3.5 inches) Physical size: 10.2 cm (4 inches)
Interface	Serial ATA
Synchronous Transfer Rate (Maximum)	150 MB/s
Buffer	8 MB
Rotational Speed	7,200 rpm

160-GB	
Capacity	160,041,885,696 bytes
Height	2.54 cm (1 inch)
Width	Media diameter: 8.89 cm (3.5 inches) Physical size: 10.2 cm (4 inches)
Interface	Serial ATA
Synchronous Transfer Rate (Maximum)	150 MB/s
Buffer	8 MB
Rotational Speed	7,200 rpm
250 GB	
Capacity	250,059,350,016 bytes
Height	2.6 cm (1 inch)
Width	Media diameter: 8.89 cm (3.5 inches)
	Physical size: 10.2 cm (4 inches)
Interface	Serial ATA
Synchronous Transfer Rate (Maximum)	150 MB/s
Buffer	8 MB
Rotational Speed	7,200 rpm
300 GB	
Capacity	250059350016 bytes
Height	2.6 cm (1 inch)
Width	Media diameter: 3.5 inches (8.9 cm)
	Physical size: 4 inches (10.2 cm)
Interface	Serial ATA
Synchronous Transfer Rate (Maximum)	150 MB/s
Buffer	8 MB
Rotational Speed	7,200 rpm

10,000 rpm SATA Hard Drives

10,000 rpm SATA Hard Drives	
36 GB	
Capacity	37,019,566,080 bytes
Height	2.6 cm (1 inch)
Width	Media diameter: 84 mm (3.3 inches)
	Physical size: 10.2 cm (4 inches)
Interface	Serial ATA
Synchronous Transfer Rate (Maximum)	150 MB/s
Buffer	8 MB
Rotational Speed	10,000 rpm
74 GB	
Capacity	74,355,769,344 bytes
Height	2.54 cm (1 inch)
Width	Media diameter: 84 mm (3.3 inches)
	Physical size: 10.2 cm (4 inches)
Interface	Serial ATA
Synchronous Transfer Rate (Maximum)	150 MB/s
Rotational Speed	10,000 rpm

Ultra320 SCSI hard drives (10,000 rpm)

Ultra320 SCSI hard drives (10,000 rpm)	
73 GB	
Capacity	73,000 MB
Height	2.54 cm (1 inch)
Width	8.9 cm (3.5 inch)
Interface	Ultra320 SCSI
Synchronous Transfer Rate (Maximum)	320 MB/s
Rotational Speed	10,000 rpm

300 GB	
Capacity	300,000 MB
Height	2.54 cm (1 inch)
Width	8.9 cm (3.5 inch)
Interface	Ultra320 SCSI
Synchronous Transfer Rate (Maximum)	320 MB/s
Rotational Speed	10,000 rpm

Ultra320 SCSI Hard Drives (15,000 rpm)

Ultra320 SCSI hard drives (15,000 rpm)	
36 GB	
Capacity	36,400 MB
Height	2.54 cm (1 inch)
Width	8.9 cm (3.5 inch)
Interface	Ultra320 SCSI
Synchronous Transfer Rate (Maximum)	320 MB/s
Rotational Speed	15,000 rpm
73 GB	
Capacity	73,000 MB
Height	2.54 cm (1 inch)
Width	8.9 cm (3.5 inch)
Interface	Ultra320 SCSI
Synchronous Transfer Rate (Maximum)	320 MB/s
Rotational Speed	15,000 rpm
146 GB	
Capacity	146,000 MB
Height	2.54 cm (1 inch)
Width	8.9 cm (3.5 inch)
Interface	Ultra320 SCSI
Synchronous Transfer Rate (Maximum)	320 MB/s

Rotational Speed	15,000 rpm

48X CD-ROM Drive	
Capacity	700 MB CD disc
Dimensions (HxWxD)	4.13 x 14.6 x 18.5 cm (1.63 x 5.83 x 7.27 inches)
Weight	0.8 kg (1.76 lbs)
Interface	ATAPI/EIDE
Data Transfer Rates - Read	Digital audio extraction (minimum) - 1,200 KB/s (8X) CD read - up to 7,200 KB/s (48X)
Data Transfer Modes	PIO Mode 4 (16.6 MB/s) Multi-word DMA mode 2 (16.6 MB/s) UltraDMA Mode 0 (16.7 MB/s) UltraDMA Mode 2 (33.3 MB/s)
16X/40X DVD-ROM Drive with +R Read Support	
Capacity	**DVD-ROM** 4.7 GB (DVD-5), 8.54 GB (DVD-9), 9.4 GB (DVD-10), 3.95 GB (DVD-R version 1.0), 4.7 GB (DVD-R version 2.0), 4.7 GB (DVD-RW version 1.0 and 1.1), 4.7 GB (DVD+RW), 4.7G (DVD+R) **CD-ROM** 540 MB (Mode 1, 12 cm), 640 MB (Mode 2, 12 cm), 700 MB (80 minimum CD-R and CD-RW), 180 MB (8 cm)
Interface	ATAPI/EIDE
Dimensions (HxWxD)	149.5 x 43.25 x 200.0 [max] mm (5.88 x 1.71 x 7.87 [max] inches) (external, excluding bezel)
Height	13.3 cm (5.25 inches), half-height, tray load
Data Transfer Rates	**Digital audio extraction (minimum)** 1,800 KB/s (12X)

	CD read up to 7,200 KB/s (48X)
HP 48X CD-RW	
Dimensions (HxWxD)	4.13 x 14.6 x 18.5 [max] cm (1.63 x 5.75 x 7.27 [max] inches) (external, excluding bezel)
Height	13.3 cm (5.25 inches), half-height, tray load
Data Transfer Rates	**CD ROM read** 6000 KB/s (40X) Max **DVD ROM read** 21,600 KB/s (16X) Max
48X Combo CD-RW/DVD-ROM	
Capacity	180 MB (mode 2, 8 cm); 540 MB (mode 1, 12 cm); 650 MB (mode 2, 12 cm); 700 MB (Mode 2, 12 cm); 4.7 GB (DVD-5); 8.54 GB (DVD-9); 9.4 GB (DVD-10)
Interface	ATAPI/EIDE
Dimensions (HxWxD)	14.66 x 4.34 x 20.0 [max] cm (5.77 x 1.71 x 7.87 [max] inches) (external, excluding bezel)
Height	13.3 cm (5.25 inches), half-height, tray load
Data Transfer Rates	**CD-ROM, CD-R, CD-RW read** 7200 KB/s (48X) Max **DVD ROM read** 21,632 KB/s (16X) Max
8X DVD+R/+RW	
Disc recording capacity	4.7 GB
Interface	ATAPI/EIDE
Dimensions (HxWxD)	15.0 x 4.4 x 20.3 cm (5.9 x 1.7 x 8.0 inches)

Height	13.3 cm (5.25 inches), half-height, tray load
Write speed (max)	**DVD+R** 8X CLV (10800 KB/s) **DVD+RW** 4X CLV (5400 KB/s) **4X CLV (5400 KB/s)** 24X CLV (3600 KB/s) **CD-RW** 10X CLV (1500 KB/s)
Read speed (max)	**DVD-ROM** 12X CAV (6750 - 16200 KB/s) **DVD+R, DVD+RW** 8X CAV (5400 - 10800 KB/s) **CD-ROM, CD-R, CD-RW, CD-Audio** 40X CAV (2550 to 6000 KB/s)

Processor features

Processor	Single or dual Intel Xeon processors (Nocona) with EM64T and Hyper-Threading Technology
Chipset	Intel E7525
Intel Pentium 4 Processors	**Intel Xeon Processor with 800 MHz Front Side Bus, 1 MB L2 cache** • 2.8 GHz • 3.2 GHz • 3.4 GHz • 3.6 GHz

	2nd Intel Xeon Processor with 800 MHz Front Side Bus, 1 MB L2 cache • 2.8 GHz • 3.2 GHz • 3.4 GHz • 3.6 GHz
Standard L2 Cache	1 MB L2 cache
Front Side Bus	800 MHz FSB
Memory Speed Supported	• 4 DIMMs • DDR-2 (ECC and non-ECC)

Security

Security features	Purpose
Removable Media Boot	Prevents booting from the removable media drives.
Serial, Parallel, USB, or Infrared Interface Control	Prevents transfer of data through the integrated serial, parallel, USB (universal serial bus), or infrared interface.
Smart Cover Sensor	Indicates that computer cover or side panel has been removed. Can be set to require the setup password to restart the computer, after the cover or side panel has been removed. Refer to the Hardware Reference Guide on the Documentation Library CD for more information about this feature. This feature is available on select models only.
Master Boot Record Security	May prevent unintentional or malicious changes to the Master Boot Record of the current bootable disk, and provides a means of recovering the “last known good﷽? MBR.
Memory Change Alerts	Detects when memory modules have been added, moved, or removed; notifies user and system administrator.
Ownership	Displays ownership information, as

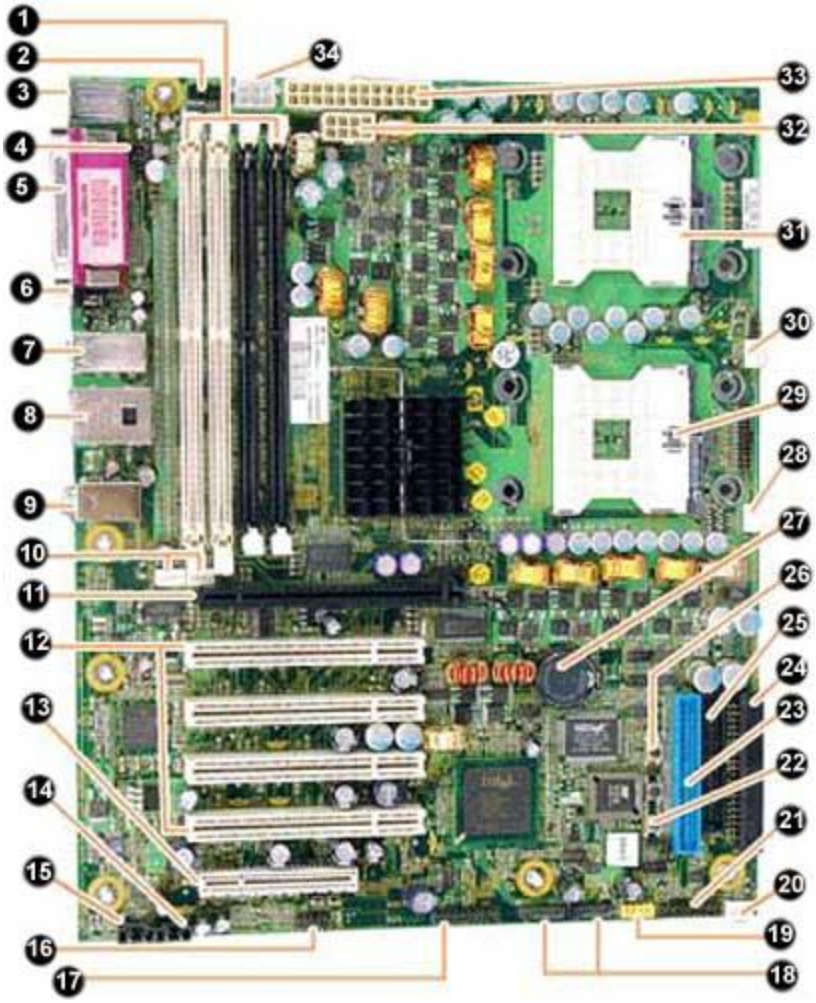
Tag	defined by the system administrator, during system startup (protected by setup password).
Power-On Password	Prevents an unauthorized person from booting up the computer
Setup Password	Prevents an unauthorized person from changing the system configuration

Hardware security

The following security devices are available as options or after-market purchases.

- Solenoid lock
- Hood sensor
- Kensington lock
- Port control option
- Chassis clamp lock

System board components



1 - Memory Module Sockets
2 - Multibay
3 - Keyboard / Mouse
4 - Solenoid Hood Lock
5 - Parallel
6 - Serial
7 - USB
8 - Network USB
9 - Audio
10 - Rear Chassis Fans
11 - PCI-Express x16 (graphics)
12 - PCI
13 - PCI-Express x8 Prime
14 - Auxiliary Audio
15 - CD-ROM Audio
16 - Front Audio
17 - Trusted Platform Module
18 - Serial ATA
19 - Front USB
20 - Front Chassis Fan
21 - Front Control Panel

22 - Hard Disk Activity LED
23 - Primary IDE
24 - Secondary IDE
25 - Floppy Disk Drive
26 - Clear CMOS button
27 - Battery
28 - Processor 2 Fan
29 - Processor 2
30 - Processor 1 Fan
31 - Processor 1
32 - ATX 12V Power
33 - Main Power
34 - Auxiliary Power

Video

NVIDIA Quadro 280 NVS (PCI)
NVIDIA Quadro NVS 280 Graphics Card (PCI-Express)
NVIDIA Quadro4 400 NVS Graphics Card
NVIDIA Quadro FX 330 Graphics Card ATI FireGL V3100 graphics card
ATI FireGL V3100 graphics card
NVIDIA Quadro FX 1300 Graphics Card

NVIDIA Quadro 280 NVS (PCI)	
Form Factor	ATX
Graphic Controller	Integrated Quadro 280 2-D graphics processor unit (GPU)
VGA controller	Integrated into the Quadro GPU
Bus type	PCI
RAMDAC	Dual 350 MHz
Memory	64 MB DDR with frame buffer and Texture storage
Connector	Single High-density Flex Connector
Dimensions	Low-profile, 6.57 x 16.76 cm (2.586 x 6.6 inches)
Controller clock speed	275 MHz
Color panes	32-bit color buffer
Overlay planes	1 16-bit Video overlay plane
Maximum vertical refresh rate	120 Hz
Maximum	350 MHz

pixel clock	
Multi-monitor support	Dual analog or digital monitors
Single DVI Support	Yes
Dual DVI Support	Yes
High-definition Video Processor (HDVP)	Full-screen, full-frame video playback of HDTV and DVD content DVD-ready motion compensation for MPEG-2 Independent hardware color controls for video overlay Hardware color-space conversion (YUV 4:2:2 and 4:2:0) IDCT motion compensation 5-tap horizontal by 3-tap vertical filtering 8:1 up/down scaling
Available graphics drivers	Microsoft Windows 2000 and Microsoft Windows XP (Provides full native Dual View mode, Span or Big Desktop mode, and Clone mode) Red Hat Linux HP qualified drivers may be preloaded or available from the HP support Web site: http://welcome.hp.com/country/us/eng/software_drivers.html

Analog resolution	Maximum colors supported	Maximum refresh rate
640 x 480	16.7 M	240 Hz
800 x 600	16.7 M	240 Hz
1024 x 768	16.7 M	200 Hz
1600 x 1200	16.7 M	170 Hz
1600 x 1200	16.7 M	150 Hz
1600 x 1200	16.7 M	100 Hz
1920 x 1200	16.7 M	85 Hz
1920 x 1200	16.7 M	85 Hz
1920 x 1440	16.7 M	75 Hz

2048 x 1536	16.7 M	60 Hz

Digital resolution	Maximum colors supported	Maximum refresh rate
640 x 480	16.7 M	75 Hz
800 x 600	16.7 M	75 Hz
1024 x 768	16.7 M	75 Hz
1152 x 864	16.7 M	60 Hz
1280 x 1024	16.7 M	60 Hz
1600 x 1200	16.7 M	60 Hz (primary only)

NVIDIA Quadro NVS 280 Graphics Card (PCI-Express)	
NVIDIA Quadro NVS 280 Graphics Card (PCI-Express)	
Form factor	ATX
Graphics controller	Integrated Quadro 280 2-D graphics processor unit (GPU)
VGA controller	Integrated into the Quadro GPU
Bus Type	PCI-Express x16 or PCI
RAMDAC	Dual 350 MHz integrated
Memory	64 MB 000 MHz DDR SDRAM unified frame buffer, Z-buffer and Texture storage
Connectors	Single High-density Flex Connector
Multi-monitor support	Dual integrated analog display controllers supporting up to two analog displays at 1920 x 1200 @ 85Hz or two digital displays at 1600 x 1200 @ 60Hz
Additional	

product features	
Controller Clock speed	250 MHz
Color planes	32-bit color buffer
Overlay planes	1 16-bit Video overlay plane
Maximum vertical refresh rate	120 Hz
Maximum pixel clock	350 MHz
Single DVI Support	Yes
Dual DVI Support	Yes
High-definition Video Processor (HDVP)	Full-screen, full-frame video playback of HDTV and DVD content DVD-ready motion compensation for MPEG-2 Independent hardware color controls for video overlay Hardware color-space conversion (YUV 4:2:2 and 4:2:0) IDCT motion compensation 5-tap horizontal by 3-tap vertical filtering 8:1 up/down scaling
PCI-Express	Supports X16 PCI-E
Available graphics drivers	Microsoft Windows XP or Windows 2000 (Provides full native Dual View mode, Span or Big Desktop mode, and Clone mode) HP qualified drivers may be preloaded or available from the HP support Web site: http://welcome.hp.com/country/us/eng/software_drivers.htm

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NVIDIA Quadro NVS 280 PCI-E Graphics Controller display resolutions and refresh rates		
Analog resolution	**Maximum colors supported**	**Maximum refresh rate**
640 x 480	16.7 M	240 Hz
800 x 600	16.7 M	240 Hz
1024 x 768	16.7 M	240 Hz
1152 x 864	16.7 M	170 Hz
1280 x 1024	16.7 M	150 Hz
1600 x 1200	16.7 M	100 Hz
1920 x 1080	16.7 M	85 Hz
1920 x 1200	16.7 M	85 Hz
1920 x 1440	16.7 M	75 Hz
2048 x 1536	16.7 M	60 Hz
Digital resolution	**Maximum colors supported**	**Maximum refresh rate**
640 x 480	16.7 M	75 Hz
800 x 600	16.7 M	75 Hz
1024 x 768	16.7 M	75 Hz
1152 x 864	16.7 M	60 Hz
1280 x 1024	16.7 M	60 Hz
1600 x 1200	16.7 M	60 Hz

NVIDIA Quadro4 400 NVS Graphics Card	
Form factor	ATX
Graphics controller	Integrated Quadro4 2D/3D 128-bit graphics processor unit (GPU)
Bus type	PCI
RAMDAC	Dual 350 MHz
Memory	64 MB 220 MHz, 4mx 32 DDR per GPU, 32-MB per GPU unified frame buffer
Connectors	Dual LFH-60
Dimensions	Low-profile form factor
Multi-monitor Support	1 to 4 displays with nView – with two cards (1 PCI per card), up to 8 monitors can be driven

View Hardware Architecture	32-bit color 2048x1536 @ 75Hz maximum resolution Dual 350 MHz RAMDACs Integrated TMDS Digital Vibrance Control (DVC) High-performance 2D rendering engine Optimized for 32-, 24-, 16-, 15- and 8-bpp modes
High-definition video processor (HDVP)	Full-screen, full-frame video playback of HDTV and DVD content DVD-ready motion compensation for MPEG-2 Independent hardware color controls for video overlay Hardware color-space conversion (YUV 4:2:2 and 4:2:0) IDCT Motion compensation 5-tap horizontal by 3-tap vertical filtering 8:1 up/down scaling
Supported graphics APIs	Fully compliant with OpenGL 1.3 and DirectX 8.1
Available graphics drivers	Microsoft Windows XP and Microsoft Windows 2000, Linux See: http://www.hp.com/workstations/support

NVIDIA Quadro4 400 NVS display resolutions & refresh rates		
Single CRT Display		
Resolution	**Maximum refresh rate**	**Bits per pixel**
640 x 480	120 Hz	8, 16, 24
800 x 600	120 Hz	8, 16, 24
1024 x 768	120 Hz	8, 16, 24

1152 x 864	120 Hz	8, 16, 24
1280 x 1024	120 Hz	8, 16, 24
1600 x 1200	100 Hz	8, 16
1600 x 1200	85 Hz	8, 16, 24
1920 x 1080	100 Hz	8, 16
1920 x 1080	75 Hz	8, 16, 24
1920 x 1200	85 Hz	8, 16
1920 x 1200	70 Hz	8, 16, 24
1920 x 1440	75 Hz	8, 16
1920 x 1440	60 Hz	8, 16, 24
2048 x 1536	60 Hz	8, 16

NVIDIA Quadro FX 330 Graphics Card	
Form factor	ATX
Graphics controller	NVIDIA Nv37GL
Bus type	PCI-Express x16
RAMDAC	Dual 400 MHz integrated
Memory	64 MB 000 MHz DDR SDRAM unified frame buffer, Z-buffer and Texture storage
Connectors	DMS-59 output supporting up to two analog or digital displays
Multi-monitor support	Dual integrated analog display controllers supporting up to two analog displays at 1920 x1200 @ 85Hz or two digital displays at 1600x1200 @ 60Hz
Additional product features	128 KB BIOS 3.3V Flash ROM reprogrammable by SW Hardware Overlay Planes Hardware two-sided lighting

	Hardware accelerated antialiased points and lines Quad-buffered Stereo Diamond exit rule line rasterization for improved line quality 3D Texture support Occlusion Culling Compliant with Microsoft®/Intel® PC2001 Workstation requirements Video Timings compliant with VESA DMT 1.0 and VESA GTF 1.0 specifications DDC2B+ Monitor support on all OS platforms ACPI Version 1.0b Power Management support (all modes)
PCI-Express	Supports X16 PCI-E
NV37GL GPU featuring	250 MHz engine clock rate 200 MHz memory clock rate 64-bit memory interface VGA controller nfiniteFX II programmable vertex and pixel shader technology
Supported graphics APIs	OpenGL 1.5 ICD with immediate mode support for all OGL primitive types DirectX 8,9
Available graphics drivers	HP-tested: Microsoft Windows® XP, Windows 2000, and Linux HP qualified drivers may be preloaded or available from the HP support Web site: http://welcome.hp.com/country/us/eng/software_drivers.html .

NVIDIA Quadro FX 330 Graphics Card display resolutions and refresh rates

Monitor 1, 2 Analog/Digital		
Resolution	**Maximum refresh rate**	**Bits per pixel**
640 x 480	240 Hz/75 Hz	8, 16, 32
800 x 600	240 Hz/75 Hz	8, 16, 32
1024 x 768	200 Hz/75 Hz	8, 16, 32
1152 x 864	170 Hz/60 Hz	8, 16, 32
1280 x 720	150 Hz	8, 16, 32
1280 x 960	150 Hz	8, 16, 32
1280 x 1024	150 Hz/60 Hz	8, 16, 32
1600 x 900	120 Hz	8, 16, 32
1600 x 1024	100 Hz	8, 16, 32
1600 x 1200	100 Hz/60 Hz	8, 16, 32
1920 x 1080	85 Hz	8, 16, 32
1920 x 1200	85 Hz	8, 16, 32
1920 x 1440	85 Hz	8, 16, 32
2048 x 1536	85 Hz	8, 16, 32

ATI FireGL V3100 graphics card	
Form factor	ATX
Graphics controller	RV370
Bus type	PCI-Express x16
RAMDAC	Dual 450 MHz integrated
Memory	128 MB DDR unified frame buffer, Z-buffer and Texture storage
Connectors	1 DVI-I analog/digital and 1 VGA monitor output
Multi-monitor Support	Dual integrated display controllers supporting up to 2048 x 1536 @ 85 Hz on both displays
Additional products features	128 KB BIOS 3.3V Flash ROM reprogrammable by SW Hardware Overlay Planes Hardware two-sided lighting Hardware accelerated antialiased points and lines

	Diamond exit rule line rasterization for improved line quality 3D Texture support Occlusion Culling Compliant with Microsoft/Intel PC2001 Workstation requirements Video Timings compliant with VESA DMT 1.0 and VESA GTF 1.0 specifications DDC2B+ Monitor support on all OS platforms ACPI Version 1.0b Power Management support (all modes)
PCI-Express 1.0	16 lane PCI-Express connector
RV370 GPU featuring	400 MHz engine clock rate 200 MHz memory clock rate 128-bit memory interface VGA controller Programmable Vertex and Pixel Shader 3.0
Supported graphics APIs	OpenGL 1.5 ICD with immediate mode support for all OGL primitive types DirectX 8,9
Available graphics drivers	HP-tested Windows XP HP-tested Windows 2000 HP-tested Linux HP qualified drivers may be preloaded or available from the HP support web site.
ATI FireGL V3100 Graphics Card display	

resolutions and refresh rates Monitor 1, 2 Aalog/Digital		
Resolution	**Maximum refresh rate**	**Bits per pixel**
640 x 480	240 Hz / 240 Hz	8, 16, 32
800 x 600	240 Hz / 200 Hz	8, 16, 32
1024 x 768	200 Hz / 140 Hz	8, 16, 32
1152 x 864	170 Hz / 100 Hz	8, 16, 32
1280 x 720	150 Hz / 120 Hz	8, 16, 32
1280 x 960	150 Hz / 85 Hz	8, 16, 32
1280 x 1024	150 Hz / 85 Hz	8, 16, 32
1600 x 900	120 Hz / 75 Hz	8, 16, 32
1600 x 1024	100 Hz / 72 Hz	8, 16, 32
1600 x 1200	120 Hz / 60 Hz	8, 16
1600 x 1200	100 Hz / 60 Hz	32
1920 x 1080	100 Hz	8, 16
1920 x 1080	85 Hz	32
1920 x 1200	100 Hz	8, 16
1920 x 1200	85 Hz	32
1920 x 1440	85 Hz	8, 16, 32
2048 x 1536	85 Hz	8, 16, 32
NVIDIA Quadro FX 1300 Graphics Card		
Form factor	ATX	
Graphics controller	NVIDIA Nv38GL	
Bus type	PCI-Express x16	
RAMDAC	Dual 400 MHz integrated	
Memory	128 MB 000 MHz DDR SDRAM unified frame buffer, Z-buffer and Texture storage	
Connectors	2 DVI-I analog/digital monitor outputs, 1 3-pin Mini DIN stereo output	
Multi-monitor support	Dual integrated analog display controllers supporting up to two analog displays at 2048 x 1536 at 60 Hz on both displays.	
Additional product	128 KB BIOS 3.3V Flash ROM reprogrammable by SW	

features	Hardware Overlay Planes Hardware two-sided lighting Hardware accelerated anti-aliased points and lines Quad-buffered Stereo Diamond exit rule line rasterization for improved line quality 3D Texture support Occlusion Culling Dual Link DVI on one output enabling driving digital displays up to 2048 x 1536 Compliant with Microsoft/Intel PC2001 Workstation requirements Video Timings compliant with VESA DMT 1.0 and VESA GTF 1.0 specifications DDC2B+ Monitor support on all OS platforms ACPI Version 1.0b Power Management support (all modes)
PCI-Express	Supports X16 PCI-E or 16 lane PCI-Express connector
NV38GL GPU	250 MHz engine clock rate 200 MHz memory clock rate 64-bit memory interface VGA controller nfiniteFX II programmable vertex and pixel shader technology
Supported graphics APIs	OpenGL 1.5 ICD with immediate mode support for all OGL primitive types

	DirectX 8,9
Available graphics drivers	HP-tested: Microsoft Windows XP, Windows 2000, and Linux HP qualified drivers may be preloaded or available from the HP support Web site

NVIDIA Quadro FX 1300 Graphics Card display resolutions and refresh rates **Monitor 1, 2 Analog/Digital**		
Resolutions	**Maximum refresh rate**	**Bits per pixel**
640 x 480	240 Hz / 240 Hz	8, 16, 32
800 x 600	240 Hz / 200 Hz	8, 16, 32
1024 x 768	200 Hz / 140 Hz	8, 16, 32
1152 x 864	170 Hz / 100 Hz	8, 16, 32
1280 x 720	150 Hz / 120 Hz	8, 16, 32
1280 x 960	150 Hz / 85 Hz	8, 16, 32
1280 x 1024	150 Hz / 85 Hz	8, 16, 32
1600 x 900	120 Hz / 75 Hz	8, 16, 32
1600 x 1024	100 Hz / 72 Hz	8, 16, 32
1600 x 1200	120 Hz / 60 Hz	8, 16
1600 x 1200	100 Hz / 60 Hz	32
1920 x 1080	100 Hz / 60 Hz	8, 16
1920 x 1080	85 Hz / 60 Hz	32
1920 x 1200	85 Hz / 60 Hz	8, 16
1920 x 1200	100 Hz / 60 Hz	32
1920 x 1440	85 Hz	8, 16, 32
2048 x 1536	85 Hz	8, 16, 32